

## ABSTRACT

### MODIFIKASYON OF CARBON PASTE ELECTRODES WITH PLANT TISSUES AND INVESTIGATION OF ELECTROCATALYSIS PROPERTIES

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By chemical modification, voltammetric electrode substrates or surfaces are treated with chemical or biological agents, so as to affect new and desired properties to the electrodes. Modification is done for several reasons. But, perhaps the most important reason is electrocatalysis. Electrocatalysis results in an increase in the rate of electron transfer, so by reducing overpotential analytes can be detected with higher specificity.

In this study, some vegetable tissues, namely henna, ginger and curcuma were mixed with graphite powder to prepare carbon pastes. Electrodes prepared with these pastes were employed by voltammetry to investigate the electrocatalysis effects of these tissues. The use of these tissues as modification agents are the first to be reported in the literature. Dopamine and uric acid were used alone or in binary mixtures as test substances. DPPH is also used as a test substance. Electrochemical behaviors of these substances were studied with naked and modified electrodes in phosphate buffer solutions of three different pH values.

In all solutions and with all the modified electrodes the peak potentials of dopamine and uric acid were shifted to more negative potentials. Namely, modified electrodes caused a reduction in overpotential. However, it was seen that dopamine and uric acid cannot be analytically determined when they are together in the same solution. On the other hand, the magnitudes of the two oxidation peaks belonging to DPPH were noticeably reduced when the modified electrodes were used. Therefore, it can be said that ginger and curcuma contain some organic molecules with antioxidant ability.

**Key words:** carbon paste electrode, henna, ginger, curcuma, voltammetry, electrocatalysis